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LNG safety – an emerging and ignored issue in the climate change debate

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The emerging practice of shifting from diesel or other non-volatile oils to natural gas as a transportation fuel entails major accident risks. In the haste and hype to reduce carbon dioxide emissions (and fuel cost) the risks are often glossed over, waved away or simply ignored.

An illuminating case is the substitution of marine diesel or fuel oil for liquefied natural gas (LNG) to power marine vessels. At face value, the environmental driver is a desire to curb carbon dioxide emissions from the marine transportation sector. LNG is cheaper than diesel and while not overtly paraded, it would be naive to ignore the economic driver. It might well be defensible to use LNG on large cargo ships. They contribute significantly to that sector's CO_2 emission and the crew onboard is rather limited and may successfully transfer to a rescue vessel in case of accident.

This is not the case, however, for ferryboats and passenger vessels because of the large number of people onboard and the tremendous obstacles associated with evacuation of large numbers of passengers, some elderly, disabled or otherwise vulnerable, from a damaged vessel at sea in case of explosion and fire. A sober assessment, if one were carried out, might well conclude that the benefits from a reduction in carbon dioxide emissions are minuscule and wholly disproportionate to the increase in accident risk.

The Norwegian shipping company Fjord Line, recently introduced LNG cruise ferries operating between Bergen, Stavanger, Langesund (Norway) and Hirtshals (Denmark). The European Investment Bank (EIB) provided a EUR 124 million loan to support the development of "sustainable European sea transportation". Each of the 170 m long ferries can carry 1.500 passengers and 600 cars.

LNG fueled vessels require LNG storage and loading facilities. The facilities present a hazard to the surrounding community and certainly to the ferry terminal itself, where a large number of passengers frequently are present. A critical issue is whether fueling of the ship is permissible while passengers are onboard or nearby. The Norwegian authorities said no, and because of timetable constraints, the ferries could only partly fuel at the LNG terminal in Risavika, near Stavanger. This led to the absurd situation where large quantities of LNG fuel to the environmentally friendly and sustainable cruise ferries was hauled by (diesel-powered) road tankers via Sweden and by another ferrylink between Sweden and Denmark, eventually to reach Hirtshals by road, where Danish authorities had no such safety reservations.

In 2012, the Danish authorities carried out a North European LNG marine infrastructure feasibility study. The study considered the use of LNG tank trucks a "well established technique" and was satisfied that road traffic with LNG tank trucks is "subject to detailed national and local safety regulations" and hence, by implication, presumably constitutes a negligible risk. Potential concerns were waved away as "lack of knowledge and scaremongering". The study paid no attention at all to societal risk. Worse, critical reasoning is absent, for instance whether it is strategically sound to introduce LNG on passenger vessels.

The substitution of diesel or fuel oil for LNG runs counter to long established core principles of inherent safety and risk reduction, for instance laid down in the ATEX directive, because a low-risk fuel is substituted for a high-risk one.

Of course, technical measures can mitigate the risks, lowering the probability of an accident, but not necessarily the consequences. Using risk terminology however, some accidents have consequences of such magnitude that the risks are simply intolerable, regardless of the probability. This is, in fact, an age-old debate. Before the 1970s overly optimistic assessments of the ability to control technological risks led to the construction of nuclear power plants, major hazard chemical facilities and large inventories of toxic substances, e.g. ammonia, near population centers, sometimes even in town centers. Nowadays, those past decisions are generally considered a strategic mistake. The question is whether exuberant, parochial and uncritical climate change intervention advocates are repeating past mistakes.